

Listing of Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

1. (Original) A method of preparing a metal surface for formation of a dielectric barrier layer, the method comprising:
providing within a processing chamber a substrate bearing a copper layer;
stabilizing a flow rate of a silicon-containing precursor flowed to an exhaust of the processing chamber;
flowing a processing gas into the processing chamber while the flow of the silicon-containing precursor is stabilized; and
flowing the stable silicon-containing precursor into the processing chamber to react with the processing gas to form a silicide layer over the copper layer.
2. (Original) The method of claim 1 wherein:
stabilizing a flow rate of a silicon precursor comprises stabilizing a flow of silane;
and
flowing the processing gas comprises flowing ammonia.
3. (Original) The method of claim 2 wherein flowing the processing gas comprises flowing ammonia mixed with nitrogen.
4. (Original) The method of claim 1 wherein the silicon-containing precursor and the processing gas are flowed through a common gas supply panel.
5. (Original) The method of claim 4 wherein the silicon-containing precursor is flowed to the chamber exhaust through a divert line.
6. (Original) The method of claim 1 further comprising forming a dielectric barrier layer over the silicide layer.
7. (Original) The method of claim 6 wherein forming the dielectric barrier layer comprises introducing a plasma within the processing chamber.

8. (Original) The method of claim 6 wherein forming the dielectric barrier layer comprises depositing a barrier layer selected from the group consisting of SiCN, oxygen doped SiC, SiN, TiN, Ta, TaN, Ta/TaN, BLOK®, and Black Diamond®.

9. (Original) The method of claim 1 wherein stabilizing the flow rate of the silicon-containing precursor comprises stabilizing the flow of one of silane, tri-methyl silane (TMS), and dimethyl phenyl silane (DMPS).

10. (Original) A gas supply panel comprising:
a first mass flow controller configured to be in fluid communication with a processing gas source through a first inlet;
a delivery line configured to be in fluid communication with the first mass flow controller and with a processing chamber through a first outlet;
a second mass flow controller configured to be in fluid communication with a source of silicon-containing precursor through a second inlet;
a divert line configured to be in fluid communication with the second mass flow controller and with a chamber exhaust through a second outlet; and
a divert valve configured to selectively place the second mass flow controller in fluid communication with the delivery line or with the divert line.

11. (Original) The gas supply panel of claim 10 wherein the divert valve comprises a three way valve.

12. (Original) The gas supply panel of claim 10 further comprising a shut off valve in fluid communication with the second mass flow controller and with the second outlet.

13. (Original) The gas supply panel of claim 10 further comprising a third inlet in fluid communication with the delivery line through a third mass flow controller.

14. (Original) The gas supply panel of claim 10 wherein the silicon-containing precursor comprises a liquid, the gas supply panel further comprising:
an injection valve configured to be in fluid communication with the second inlet and with the second mass flow controller; and
a third inlet configured to be in fluid communication with a carrier gas source and with the injection valve.

15. (Original) A substrate processing apparatus comprising:
a processing chamber including an exhaust;
a gas distribution system configured to receive and deliver gases to a gas distribution face plate located proximate to a substrate support within the processing chamber;
a gas supply panel comprising,
a first mass flow controller configured to be in fluid communication with a processing gas source through a first inlet,
a delivery line configured to be in fluid communication with the first mass flow controller and with a first outlet,
a second mass flow controller configured be in fluid communication with a source of silicon-containing precursor through a second inlet,
a divert line configured to be in fluid communication with the second mass flow controller and with a second outlet, and
a divert valve configured to selectively place the second mass flow controller in fluid communication with the delivery line or with the divert line;
a first conduit linking the first outlet with the processing chamber; and
a second conduit linking the second outlet with the processing chamber exhaust.
16. (Original) The apparatus of claim 15 wherein the divert valve comprises a three way valve.
17. (Original) The apparatus of claim 15 further comprising a shut off valve in fluid communication with the second mass flow controller and with the second outlet.
18. (Original) The apparatus of claim 15 further comprising a third inlet in fluid communication with the delivery line through a third mass flow controller.
19. (Original) The apparatus of claim 15 wherein the silicon-containing precursor comprises a liquid, the gas supply panel further comprising:
an injection valve configured to be in fluid communication with the second inlet and with the second mass flow controller; and
a third inlet configured to be in fluid communication with a carrier gas source and with the injection valve.